INSTRUCTION MANUAL

REGULATED POWER SUPPLIES

LFQ-26,LFQ-26-1

SPECIFICATIONS AND FEATURES

MP MASTER
MA28357

DC OUTPUT — Voltage regulated for line and load. For voltage and current ratings see table I below.

TABLE I

OUTPUT NO.	VOLTAGE RANGE (VOLTS)	MAXIMUM CURRENT (AMPS)* AT AMBIENT TEMPERATURE		
		40°C	50°C	60°C
1	5±5% adjustable	50*	42	34
2	11.4-15.75 @ 12V±5%	6	5.1	4.2
	adjustable @ 15V±5%	4.8	4.1	3.4
3	11.4-15.75 @ 12V±5%	6	5.1	4.2
	adjustable @ 15V±5%	4.8	4.1	3.4
4	22.8-29.4 @ 24V±5%	1	0.85	0.70
	adjustable @ 28V±5%	0.86	0.73	0.60
4 (For LFQ-26-1 units only)	5±5% adjustable	5.0	4.2	3.5
	MAXIMUM OUTPUT POWER	325W	276W	227W

Refer to OUTPUT CURRENT PROFILE CURVE for auxiliary output current Vs main output current. (Fig. 1)

*Minimum preload of 12.5A is required on 5V output for I_{OUT}MAX on auxiliary outputs

REGULATED VOLTAGE OUTPUT

Regulated (line) . . . . . 0.1% for input variations from 95-132 VAC and from 187 to 265 VAC

Regulation (load) . . . . . 0.1% for load variations from no load to full load or full load to no load on 5V output.
1% for load variations from no load to full load or full load to no load on 12/15V output.*
2% for load variations from no load to full load or full load to no load on 24/28V output.*
0.2% for load variations from no load to full load or full load to no load on LFQ-26-1 5V output.

*12.5A preload required on 5V output.

Cross-Regulation . . . . . Auxiliary output - 0.1% for load variations on 5V output from preload to full load current.
5V output — 0.1% for load variations on auxiliary outputs from no load to full load.

Ripple and Noise . . . . . 15 mV rms, 100 mV peak to peak for each 5V output.
25 mV rms, 150 mV peak to peak for 12/15V output and 25 mV rms, 250 mV peak to peak for 24/28V output with either positive or negative terminals grounded, when measured with a balanced probe (20 MHz bandwidth measurement system).

Temperature Coefficient . . . . . 0.03%/°C.

Remote Programming (5V output only)

External Resistor . . . . . Nominal 1000 ohms/volt output.

Programming Voltage . . . . . One-to-one voltage change.

Remote Sensing . . . . . Provision is made for remote sensing to eliminate the effect of power output lead resistance on DC regulation of the 5V output.

Remote On/Off Control . . . . . TTL compatible signal enables remote turn-on/turn-off of the power supply. A voltage of 2.8 to 5.0V supplied to the remote on/off terminals will initiate turn off. Open circuit, short circuit, or a zero to 0.5 signal at remote on/off terminals will cause turn on. (See Figure 4.)

Inrush Limiting . . . . . The turn-on inrush current will not exceed 40A peak.

OVERSHOOT — No overshoot under conditions of power turn-on, turn-off, or power failure.

AC INPUT — 95-132 VAC @ 47-440 Hz, or 187 to 265 VAC @ 47-440 Hz via field selectable jumper. (When shipped from factory, all LFQ-26 power supplies are wired for 95-132 VAC input. To configure for 187-265 VAC input, remove jumper between PC board terminals "A" and "B"). Where applicable, regulatory agency approval applies only for input voltages up to 250 VAC and for input frequencies in the range 47-63 Hz. Leakage current in the ground connection may exceed the limits allowed by these agencies at frequencies above this range. Input power at maximum output power 434 watts.

DC INPUT — 260-370 VDC (unit must be configured for 187-265 VAC as described above). Where applicable, regulatory agency approval only applies for input voltages up to 350 VDC.

EFFICIENCY — 75% minimum at maximum output power.

RECOMMENDED FUSING — 12A, 250V normal blo fuse in AC input line (not supplied in unit) (6A, 250V normal blo fuse for 220 VAC input). If IEC type fuses are used, value should be 75% of recommended current rating.

OVERLOAD PROTECTION — Automatic electronic current limiting circuit, limits short circuit output current to a safe preset value, protecting load and power supply when direct shorts occur on any output. Overload on any output will cause all outputs to drop.

HOLD-UP TIME — All outputs will remain within regulation limits for at least 16.7 msec. after loss of AC power when operating at maximum output power (325W) and 105V AC input at 60 Hz, (or when, configured for 220VAC: 20 ms holdup when operating at maximum output power (325W) and 210 VAC input at 50 Hz.

INPUT AND OUTPUT CONNECTIONS — See outline drawing for location. AC input, remote turn-on, via PC board mounted terminal block; ground via chassis stud; DC output, 5V—via buss bar mounted on 5V board, auxiliary outputs via PC board mounted terminal block.

COOLING — Convection cooled; no external blowers required.

OPERATING AMBIENT TEMPERATURE RANGE AND DUTY CYCLE — Continuous duty from 0°C to +60°C ambient with corresponding load current ratings for all modes of operation. Unit will start up at -10°C, but may not meet published specifications until internal heating raises the temperature to 0°C.

STORAGE TEMPERATURE — -55°C to +85°C.

DC OUTPUT CONTROLS — Screwdriver voltage adjust controls permit adjustment of DC output voltage for all outputs. See outline drawing for location of controls.

GUARANTEE — 1 year guarantee from date of shipment. . . . . .materials and labor.

PHYSICAL DATA

Size	13" x 4.75" x 2.5"
Weight	6 lbs. net; 7 lbs. shipping
Finish	Gray, FED.STD.595 No. 26081

MOUNTING — Two mounting surfaces with threaded mounting holes can be utilized for mounting this unit. Air circulation is required when unit is mounted in confined areas. Customer to provide vent holes in his mounting surface to allow for air circulation. Refer to Outline Drawing for mounting details.

OVERVOLTAGE PROTECTION — 5V output only. If output voltage exceeds preset value, inverter drive is removed.

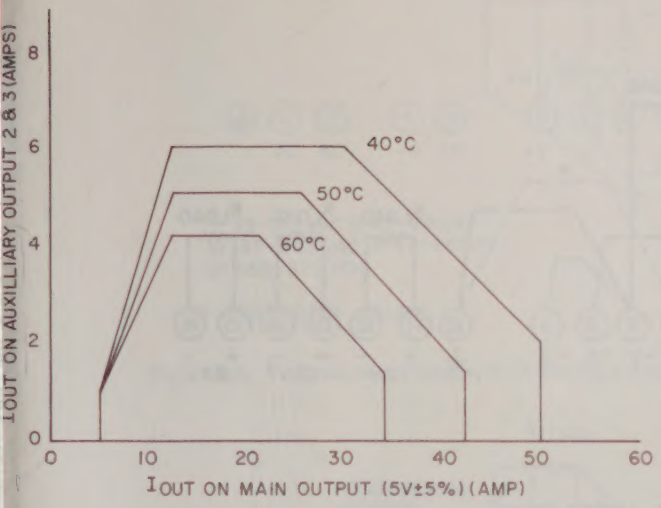
EMI SUPPRESSION — Conducted EMI conforms to: FCC Docket 20780 Class A
VDE 0871 Class A above 150 kHz

ISOLATION RATINGS — Transformer: 3750V rms (primary to 5V secondary), 1500V rms (primary to auxiliary secondaries), 1500V rms (all windings to case), 2500V rms (5V secondary to auxiliary secondaries). Input-to-ground: 1500V rms. Input-to-5V output: 3750V rms. Input-to-all other outputs: 1500V rms. Output-to-ground: 500V rms. Output-to-output: 500V rms.

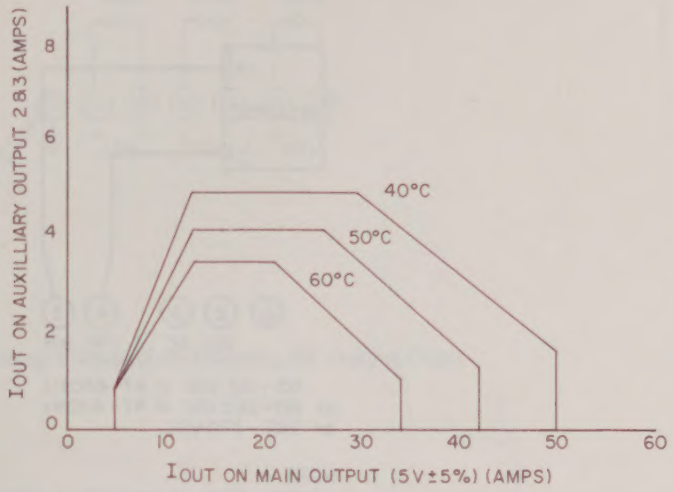
If the P.C. board(s) are removed from the chassis, the silicone rubber insulator sheet(s) must be replaced with new silicone insulator(s). HSD-00-510; HSD-00-511.

NOTE: 1.
In connection diagrams Figures 2 through 7 substitute "5V" wherever "24V" appears to connect 5V output of model LFQ-26-1 unit.

Output current on auxiliary outputs 2 and 3 versus I out on main output
(Auxiliary output 4 at maximum output current at appropriate ambient temperature as per TABLE I)



(a) Auxiliary outputs 2 and 3 adjusted to 12V ± 5%



(b) Auxiliary outputs 2 and 3 adjusted to 15V ± 5%

Figure 1. LFQ-26 Output Current Profile

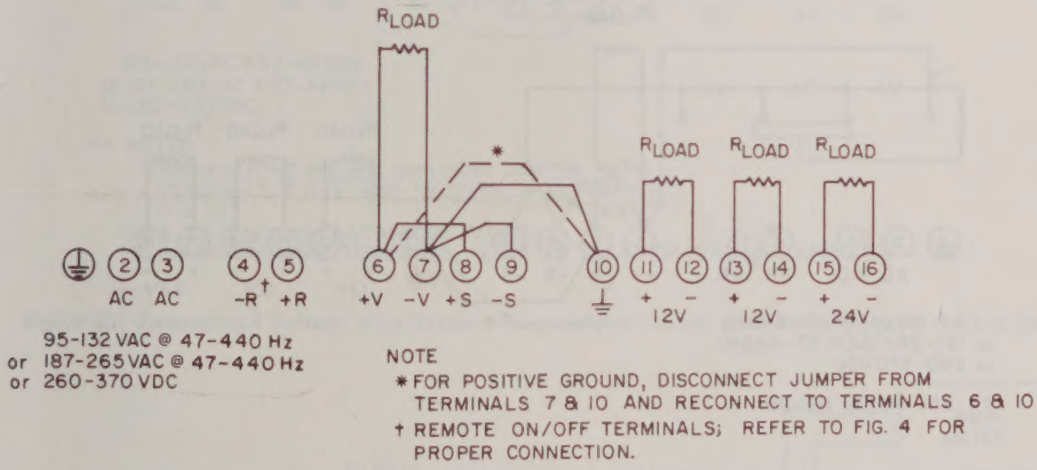


Figure 2. Local Sensing Connections

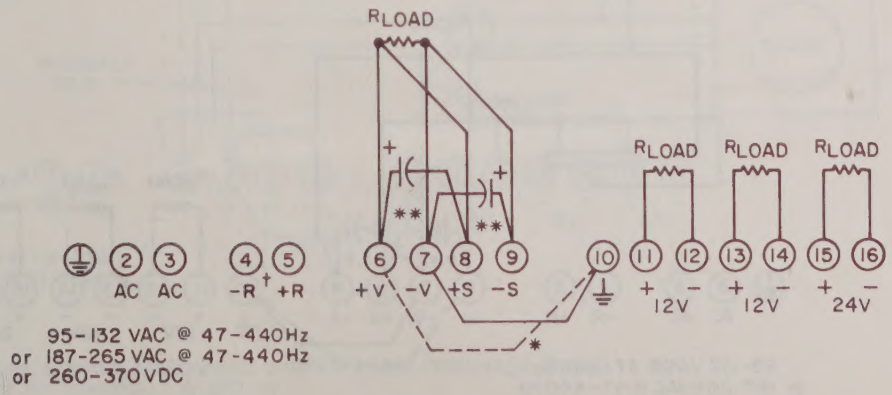


Figure 3. Remote Sensing Connections (5V Output Only)

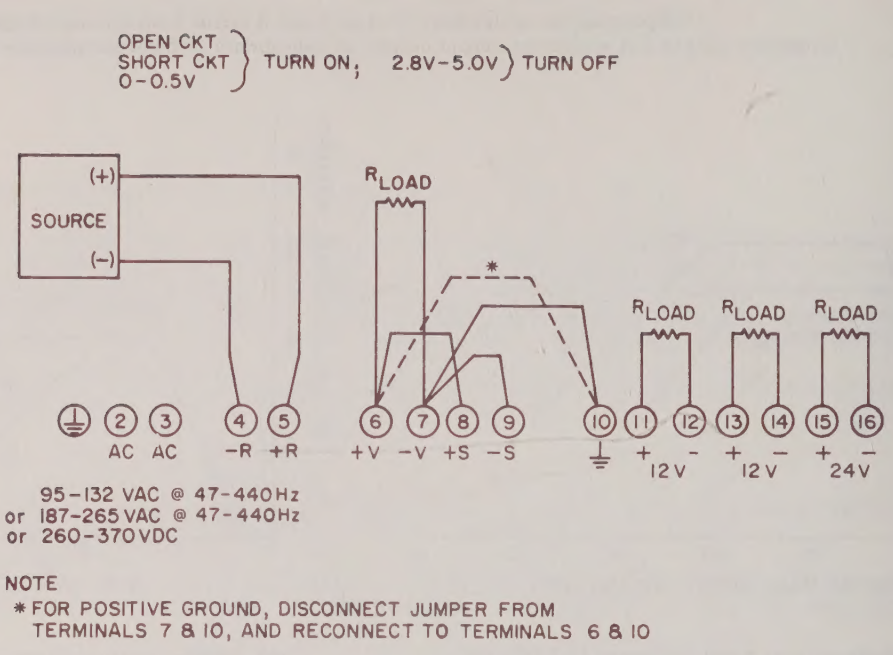


Figure 4. Remote Turn On/Turn Off

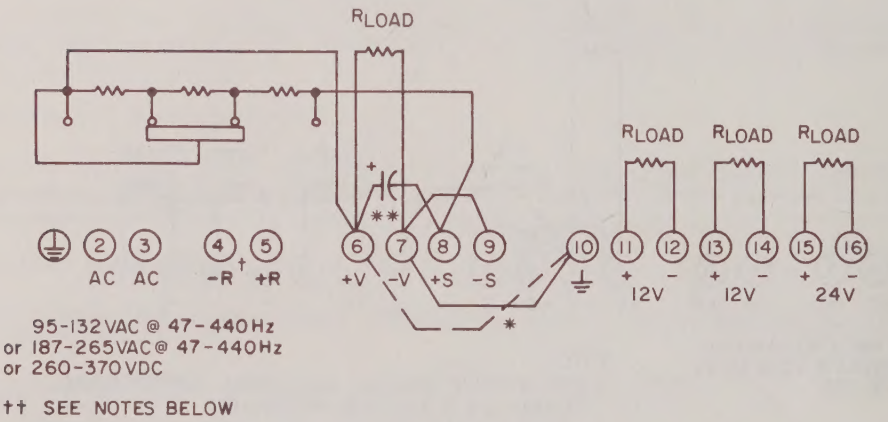


Figure 5A. Programmed Voltage, With External Resistor (Local Sensing; 5V Output Only)

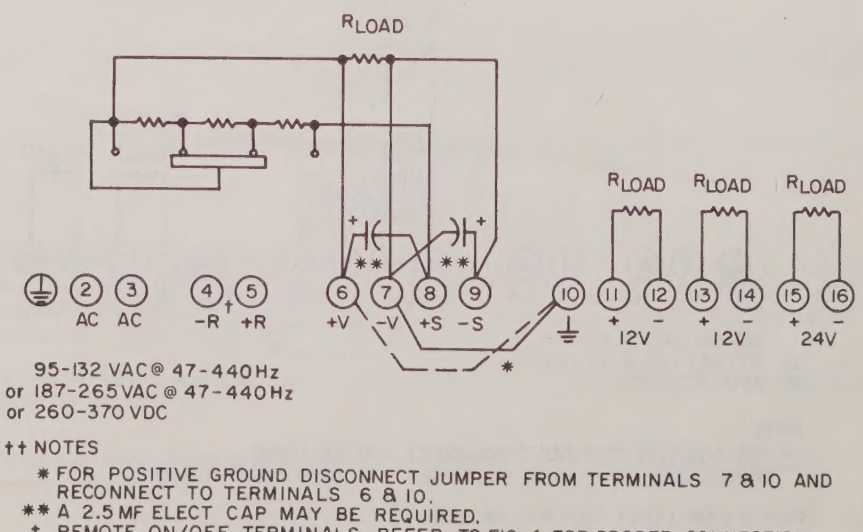


Figure 5B. Programmed Voltage With External Resistor (Remote Sensing; 5V Output Only)

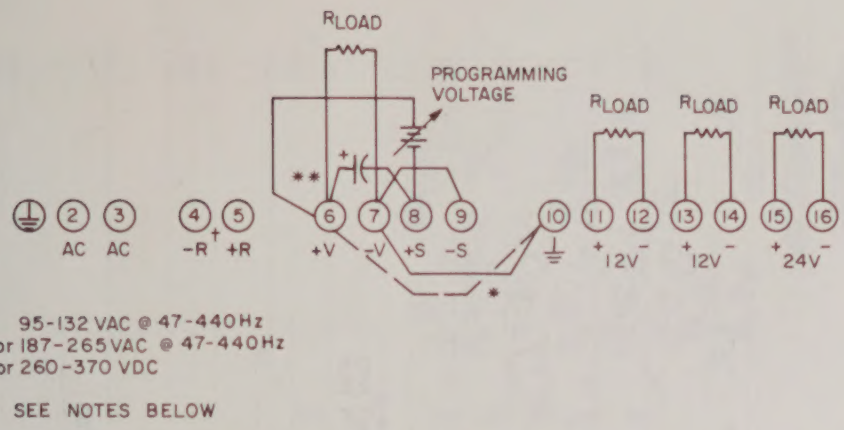
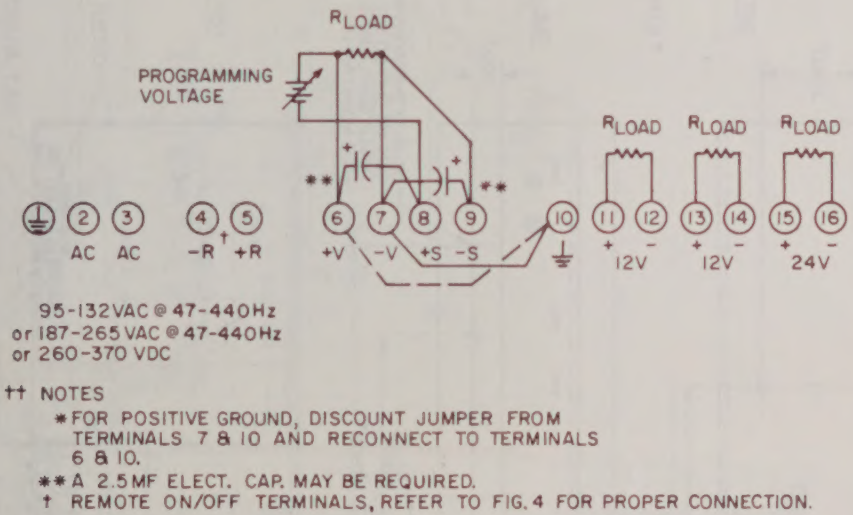


Figure 6A. Programmed Voltage, With External Programming Voltage (Local Sensing; 5V Output Only)



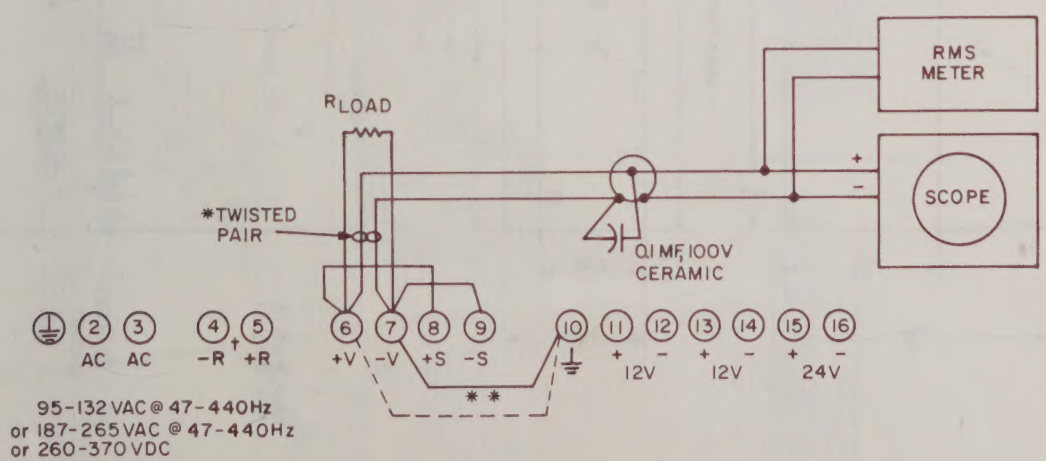
†† NOTES

* FOR POSITIVE GROUND, DISCOUNT JUMPER FROM TERMINALS 7 & 10 AND RECONNECT TO TERMINALS 6 & 10.

** A 2.5MF ELECT. CAP. MAY BE REQUIRED.

† REMOTE ON/OFF TERMINALS, REFER TO FIG. 4 FOR PROPER CONNECTION.

Figure 6B. Programmed Voltage, With External Programming Voltage (Remote Sensing; 5V Output Only)



* *FOR POSITIVE GROUND, DISCONNECT JUMPER FROM TERMINALS ⏚ AND -V AND RECONNECT TO TERMINALS ⏚ AND +V

*USE 8 INCHES OR LESS TWISTED PAIR (NO 24 GAUGE WIRE) TERMINATE WITH BNC-BNC CONNECTOR (0.1MF, 100V CERAMIC CAPACITOR ACROSS TERMINALS OF CONNECTOR AS SHOWN). LEAD LENGTHS OF TWISTED PAIR MUST BE IDENTICAL.

† REMOTE ON/OFF TERMINALS, REFER TO FIG. 4 FOR PROPER CONNECTION.

Figure 7. Connection Diagram for Measurement of Ripple and Noise (5V output only; for auxiliary outputs, although not shown, ripple measuring technique is identical)

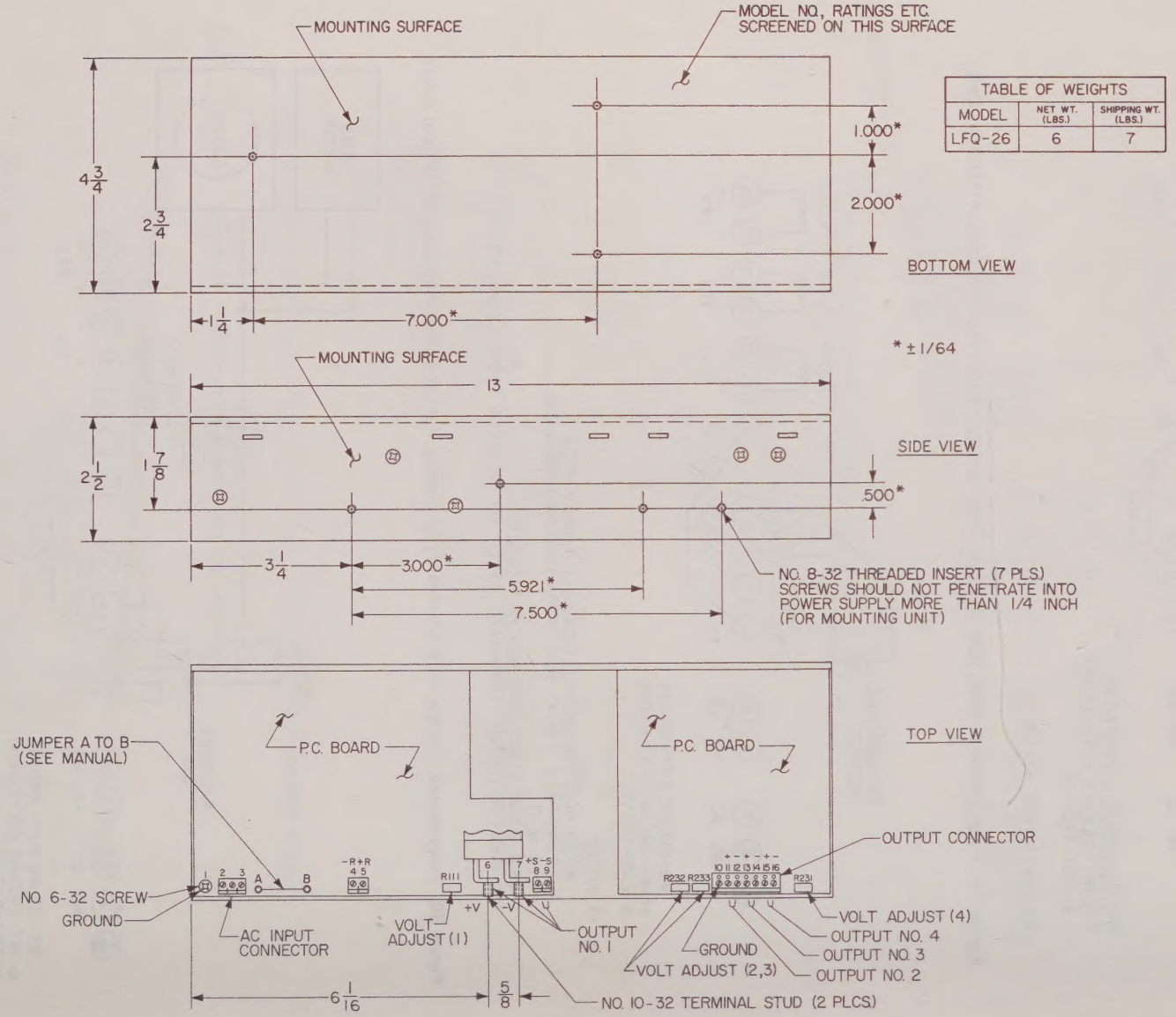
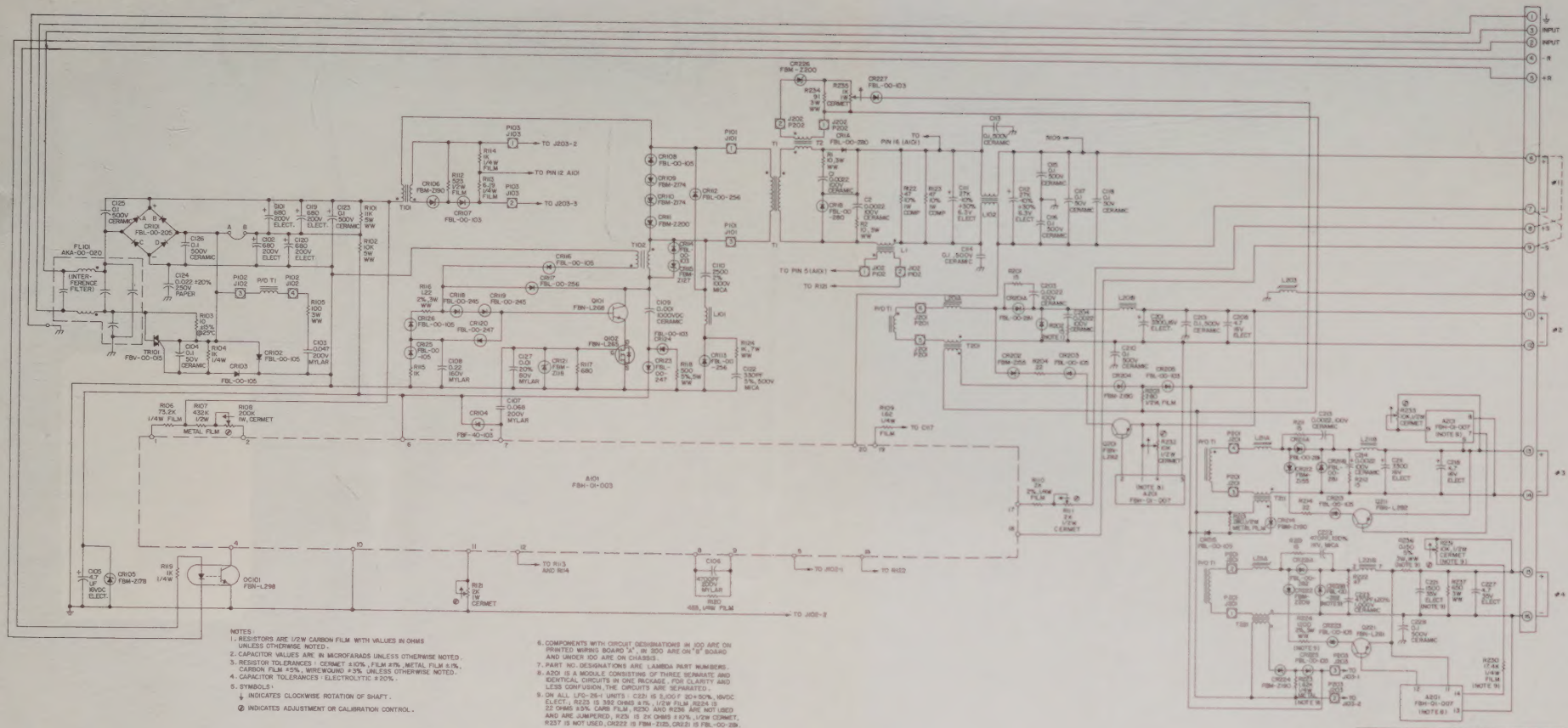


TABLE OF WEIGHTS		
MODEL	NET WT. (LBS.)	SHIPPING WT. (LBS.)
LFQ-26	6	7

Outline Drawing



NOTES:
1. RESISTORS ARE 1/2W CARBON FILM WITH VALUES IN OHMS UNLESS OTHERWISE NOTED.
2. CAPACITOR VALUES ARE IN MICROFARADS UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: CERMET ±10%, FILM ±1%, METAL FILM ±1%, CARBON FILM ±5%, WIREWOUND ±3% UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC +20%-10%.
5. SYMBOLS:
   ↓ INDICATES CLOCKWISE ROTATION OF SHAFT.
   ⌀ INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
6. COMPONENTS WITH CIRCUIT DESIGNATIONS IN 100 ARE ON PRINTED WIRING BOARD "A", IN 200 ARE ON "B" BOARD AND UNDER 100 ARE ON CHASSIS.
7. PART NO. DESIGNATIONS ARE LAMBDA PART NUMBERS.
8. A201 IS A MODULE CONSISTING OF THREE SEPARATE AND IDENTICAL CIRCUITS IN ONE PACKAGE. FOR CLARITY AND LESS CONFUSION, THE CIRCUITS ARE SEPARATED.
9. ON ALL LFQ-26-1 UNITS: C223 IS 5,000 FARADS +20%-50%, 16VDC ELECT.; R223 IS 392 OHMS ±1%, 1/2W FILM. R224 IS 22 OHMS ±5% CARB FILM. R230 AND R236 ARE NOT USED AND ARE JUMPERED. R235 IS 2K OHMS ±10%, 1/2W CERMET. R237 IS NOT USED. CR222 IS FBM-Z12D, CR223 IS FBL-00-219.

FOR WIRING OF POWER SUPPLY TO LOAD, REFER TO LOAD WIRING DIAGRAMS. DOTTED CONNECTIONS SHOWN ON TERM. 8(I). INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTIONS.

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLIES
LFQ-26, LFQ-26-1

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.

MP MASTER
MA28357